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WATER RIGHTS
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Office of Sevier River Commissioner

DELTA, UTAH R.F.D. 84624

November 30, 1972

W. ROGER WALKER

BIG SPRINGS IRRIGATION COMPANY
Burbank, Utah

Dear Sirs,

I hereby submit a preliminary report of the results of my investigation of the Big Springs Irrigation Company. The report covers the period June 10, 1972 to November 18, 1972.

Respectfully,

Roger Walker

ROGER WALKER



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HILLARD COUNTY RECORDER - LINDA S CARTER
1997 JUL 28 14:47 PM FEE \$30.00 BY CKJ
REQUEST: DEARDEN, CARL

I hereby certify that the above record is a true xerox copy of the document recorded in the office of the HILLARD COUNTY RECORDER in Book 317 of Records, Page 697-707.
IN WITNESS WHEREOF, I hereunto set my hand and affix my official seal this 30 day of July, 1997.

Linda S. Carter
LINDA S. CARTER, Millard County Recorder
Fillmore, Utah 84631

by Commission-Deputy

Preliminary Report - November 30, 1972

- BIG SPRINGS IRRIGATION COMPANY -

A study of the Big Springs Irrigation Company was initiated June 10, 1972 for the following purposes:

1. Make a proper division of the water where and when required.
2. To identify the sources of the water right.
3. Determine the quantities involved.
4. Provide basic data for possible future improvements of the utilization of the resources.
5. Define the right as it exists and bring the right up to date for the maximum legal protection. These factors are also urgently needed for a basis of future transactions.

- 1. -

The division at the Big Springs located in Nevada called for 3.5 cfs. to be diverted into one ditch and the remainder of the water to remain in the natural channel. The construction works to effect the division consisted of a concrete box approximately 18 feet long, $6\frac{1}{2}$ feet wide, 1 foot deep measured from crest of 5 foot Cipolletti weir across the east end of the box. A rectangular suppressed weir plate 14 feet $4\frac{1}{2}$ inches long located along the north side of the box is at an elevation of .35 feet above the crest of the Cipolletti weir. This arrangement in effect gave to the Cipolletti weir the first 3.5 cfs and at the observed depth of .40 feet .76 cfs. of the next 1.38 cfs.

The weir plates were $1\frac{1}{8}$ inch thick plate set in the concrete walls with 2 inches protruding. For the rectangular weir this is probably enough elevation at these heads to give complete contraction but for the Cipolletti

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weir this causes the top and ends of the concrete end wall to act as a suppressor for .4 feet in the approach to weir plate. This suppression causes an error giving more water than indicated to the East ditch below the Cipolletti weir. This was confirmed by a current-meter measurement showing 4.41 cfs. as against the discharge tables of 4.26 cfs.

The solution decided upon was to place a 4 foot Cipolletti weir in place of the 5 foot at a crest elevation of .05 feet above the old weir plate. The new weir plate was then rated in place with several current-meter measurements. These measurements were of 3.53, 3.69, 3.79, 3.69 and 3.67 cfs. for an average of 3.68 cfs. going over the Cipolletti weir. A best estimate of the results is that a transfer of 1 cfs. was made ~~from~~ the Cipolletti weir to the rectangular weir which is the amount of increase indicated at the High Line Ditch.

- 2. -

The Utah State Engineer's Technical Publication No. 14, Water-Resources Appraisal of the Snake Valley Area, Utah and Nevada, By James W. Hood and F. Eugene Rush, Geologist, U.S. Geological Survey, was published in 1965. This report estimates the average annual ground water recharge to be 105,000 acre feet. The average evapotranspiration of ground water is estimated to be 80,000 acre feet, 10,000 acre feet subsurface outflow northward to the Great Salt Lake Desert in the alluvium, and "The difference between identified discharge and the recharge, about 15,000 acre feet may be the amount of the ground-water flow from the valley fill to the carbonate-rock reservoir". Discharge from wells in 1964 was about 7,000 acre feet. The estimated perennial yield of the Snake Valley Area is about 80,000 acre feet. The report

goes on to state that the potential development of ground water is large because little of this estimated 80,000 acre feet is utilized.

As to surface water it is stated that most tributary valleys contain only intermittent streams and most of these flow only in response to snow melt and to infrequent summer thunderstorms. Coupled with these conditions was the fact that the temperature of Big Springs was 64 to 68°F. which is 10 to 20°F. above the range of the average annual air temperature. This indicates that the source of this water flowing because of artesian pressure is moderately deep.

To date the recorders have indicated very little response to storms, consequently the spring water constitutes nearly all the significant supply.

- 3. -

Included in this report are the observation notes, current-meter measurements and most of the available daily flow recordings taken on the three ditches in the vicinity of the ranch house. These records would indicate that the total flow at this point varied from 15 cfs. to 19 cfs. and gives some indication of where the flow originates and why it varies. A measurement of the total flow at the Big Spring located at 10/70-33b1 in Nevada in November 18, 1972 gave 3.80 cfs. over the Cipolletti weir and 5.1 current-metered in the channel for a total of 8.9 cfs. The recordings show that on two determinable occasions when the High Line ditch was carrying all the flow at that diversion there was approximately 9 cfs. made below this point being measured in the West and East Middle ditches. The flow to the High Line diversion would include 5.1 from the Big Spring plus unidentified inflow below the Big Spring. The unidentified inflow would include a significant quantity of return flow from the use of the 3.5 to 3.8 cfs. going

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over the Cipolletti weir. Most of the variation of flows within the system can probably be accounted for by the return flow factor.

The significance of the previously mentioned report can now be seen. This report gives the Big Springs as 8 cfs. located at 10/70-33b1 Nevada and apparently no one was aware of any other source springs. If the annual ground water recharge is 105,000 acre feet as per the report then this system accounts for yield in excess of 13% of the recharge and 17% of the perennial ground water yield of Snake Valley. The statement that potential development of ground water is large because little of the estimated 80,000 acre feet is utilized might be subject to revision.

- 4. -

When the acre foot per acre diversion quantity can be established, it will be possible to evaluate management changes for greater beneficial use..

- 5. -

Some time in the future the right to the use of water might be identified as the consumptive use plus reasonable and necessary losses. If increased efficiencies of irrigation are ever required in this system it can be seen that the right will change because of the return flow factor. For example increased acreage under irrigation for increased efficiencies above Pruess Lake would have a major impact on the storage rights. If ownership within the Big Springs system becomes diversified many legal and operational problems will result. It is therefore urgent that the use of the water be identified as to quantity and described acreage.

RECOMMENDATIONS

1. Ascertain the rights of record for the Big Springs located 10/70-33b1 at the Nevada State Engineer's Office.
2. In anticipation of acquiring a certificated right for the water rising in the State of Utah affidavits should be obtained from any person now living that can give a statement of knowledge of diverting, quantity, and where used of the water from the Big Springs system prior to 1903. These will be needed to prepare a diligence claim. It is obvious that time is running out or has run out for this requirement.
3. Old ditches or construction works proving use prior to 1903 should be located, described, and mapped.
4. Present system should have points of diversion, ditches and acreage located, described and mapped.

The first three items should be accomplished as soon as possible.

NOTES

June 10, 1972

Big Springs in Nevada- Gage Height Cipoletti weir 0.40' = 4.26 cfs.
Current-metered = 4.41 cfs.
Weir plates not standard knife edge - corroded.
Plate set in concrete wall which causes suppression to the plate
causing a discharge in excess of indicated.
East Middle Ditch - 3' Parshall flume, G.H. 0.73 = 7.33 cfs.
West Middle Ditch - 3' Parshall flume, G.H. 0.55 = 4.70 cfs.
High Line Ditch - 2' Parshall flume, submerged flow
Current-metered = 3.96 cfs.
15.99 cfs.

June 24, 1972

Big Spring - installed 4' Cipolletti weir plate
Made four current-meter measurements - 3.67, 3.69,
3.53, and 3.79 for an average of 3.63 cfs.
Installed recorder houses and recorders
High Line ditch - G.H. 0.86 = 6.33 cfs.
West Middle ditch - G.H. 0.70 = 6.9 cfs.
East Middle ditch - G.H. 0.33 = 2.12 cfs.
15.35 cfs.

July 29, 1972

Exchanged recorders
Current-metered Big Spring below Cipolletti weir 3.69 cfs.
West Middle ditch - G.H. 0.15 = 1.60 cfs.
East Middle ditch - G.H. 1.00 = 12.00 cfs.
High Line ditch - submerged - current-metered = 3.40 cfs.
17.00 cfs.

November 18, 1972

Big Spring 0.41 - more affected = 3.80 cfs.
Current-metered - channel = 5.12 cfs.
8.92 cfs.
East Middle ditch - G.H. 0.51 = 4.2 cfs.
West Middle ditch - G.H. 1.15 = 14.9 cfs.
19.1 cfs.

STATE OF UTAH

OFFICE OF STATE ENGINEER

2' Parshall Flume

Daily Discharge in Second Feet of - HIGH LINE DITCH -at DEARDEN RANCH for 19 72

Day	June cfs.	July cfs.	Aug. cfs.	Sept. cfs.	Oct. cfs.	Nov. cfs.
1				4.9	0	0
2				4.9		
3	(Parshall Flume submerged			4.9		
4	for days of no record)			4.9		
5				5.0		
6				5.0		
7				5.1		
8				5.1		
9				5.0		
10	4.0			5.1		
11				5.1		
12				5.1		
13				5.1		
14				5.3		
15				5.4		
16			4.7	5.8		
17			4.6	5.9		
18			4.7	6.3		
19			5.1	5.9		
20			5.0	3.1		
21			6.1	2.7		
22			6.8	3.0		
23			6.7	3.0		
24	6.3		6.6	2.8		
25	7.1		6.8	1.5		
26	6.6		5.9	.6		
27	5.2		5.0	0		
28	4.8		5.2	0		
29	4.8	3.4	4.9	0		
30	4.8	3.4	4.8	0		
31		4.5	4.9		0	
Subst. Sec. Ft.				116		
Total Ac. Ft.				230		

TOTAL FOR _____ ACRE FEET

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STATE OF UTAH

OFFICE OF STATE ENGINEER

3' Parshal Flume

Daily Discharge in Second Feet of WEST MIDDLE DITCHat DEARDEN RANCH for 19 72

Day		June cfs.		July cfs.		Aug. cfs.		Sept cfs.		Oct. cfs.		Nov. cfs.
1				5.8		2.2		2.1		6.9		13.3
2				5.8		2.2		2.0		6.3		13.4
3				5.6		2.1		1.9		5.7		13.4
4				4.3		1.9		3.7		5.2		13.6
5				4.7		1.6		5.0		5.4		13.8
6				4.7		1.6		5.0		5.4		13.8
7				3.4		3.1		5.0		5.4		13.8
8				4.5		4.6		4.7		6.3		13.9
9				5.0		1.7		4.8		7.5		13.9
10		4.7		4.9		4.5		4.7		12.4		13.9
11				5.0		6.0		4.7		9.1		13.9
12				4.7		6.6		4.7		7.9		13.9
13				1.5		6.9		4.5		7.9		14.1
14				1.6		7.3		3.9		7.9		14.3
15				1.9		6.3		1.8		7.9		14.3
16				1.9		3.0		2.3		7.9		14.3
17				2.6		2.5		2.3		7.9		14.4
18				2.3		2.6		2.9		7.6		
19				4.7		2.8		5.5		8.2		
20				2.3		5.4		5.8		10.4		
21				2.7		6.6		6.0		10.3		
22				2.0		5.9		6.1		11.1		
23				3.6		5.8		6.3		12.1		
24		6.7		2.2		5.7		6.5		12.8		
25		6.7		2.1		5.7		7.0		12.9		
26		4.5		3.6		2.7		7.0		12.9		
27		5.0		2.9		5.7		7.3		12.9		
28		6.1		1.9		6.1		7.4		13.1		
29		6.1		1.7		6.0		7.4		13.1		
30		5.8		2.1		4.1		7.4		13.1		
31				2.2		2.3				13.1		
Sec. Ft.				105		132		146		288		
Total Ac. Ft.				208		261		289		520		

TOTAL FOR _____ ACRE FEET

STATE OF UTAH

OFFICE OF STATE ENGINEER

3' Parshall Flume

Daily Discharge in Second Feet of - EAST MIDDLE DITCH -

at DEARDEN RANCH for 19 72

Day		June cfs.		July cfs.		Aug. cfs.		Sept. cfs.		Oct. cfs.		Nov. cfs.
1				5.8		10.8		11.1		10.9		
2				6.3		11.8		11.1		12.0		
3				7.3		11.6		10.8		11.3		
4				8.8		12.2		8.4		11.6		
5				10.3		12.2		7.8		11.6		4.3
6				10.8		11.3		7.6		11.6		4.3
7				10.6		8.5		7.6		11.4		4.2
8				8.8		9.4		7.4		9.9		4.3
9				8.2		11.1		7.2		9.1		4.2
10		7.3		8.2		8.7		7.4		5.6		4.1
11		5.0		8.2		7.9		7.4		9.2		4.2
12		4.8		7.3		9.4		7.6		7.9		4.1
13		5.6		9.1		10.9		7.8		8.0		4.0
14		3.4		9.0		11.1		8.5		8.0		4.0
15		3.5		8.4		10.2		11.1		8.0		4.0
16		4.4		8.8		10.8		10.2		8.0		4.0
17		8.7		9.8		11.6		10.2		8.2		4.5
18		8.5		9.4		11.1		9.6		8.7		
19		7.7		7.6		10.9		10.2		3.2		
20		5.6		6.7		7.3		9.1		5.8		
21		5.0		8.6		5.9		8.9		5.9		
22		2.3		8.6		6.2		8.7		5.9		
23		2.1		7.9		5.4		8.7		5.4		
24		2.1		9.2		5.9		9.5		4.3		
25		2.2		8.8		6.9		10.5		5.1		
26		3.9		8.0		10.1		10.6				
27		5.4		9.6		7.3		10.2				
28		4.8		11.4		6.9		10.2				
29		5.2		11.3		6.8		9.9				
30		5.4		10.4		9.4		10.2				
31				10.4		11.1						
Sec. Ft.				274		294		275				
Total Ac. Ft.				543		583		542				

TOTAL FOR ACRE FEET

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STATE OF UTAH

OFFICE OF STATE ENGINEER

Daily Discharge in Second Feet of - TOTAL FLOW - THREE DITCHES -at DEARDEN RANCH for 19 72

Day		June cfs.		July cfs.		Aug. cfs.		Sept. cfs.		Oct. cfs.		Nov. cfs.
1								18.1		17.8		
2								18.0		18.3		
3								17.6		17.0		
4								17.0		17.3		
5								17.8		17.0		18.1
6								17.6		17.0		18.1
7								17.7		16.8		18.0
8								17.2		16.2		18.2
9								17.0		16.6		18.1
10								17.2		18.0		18.0
11								17.2		18.3		18.1
12								17.4		15.8		18.0
13								17.4		15.9		18.1
14								17.7		15.9		18.3
15								18.3		15.9		18.3
16						18.5		18.3		15.9		18.3
17						18.7		18.4		16.1		18.9
18						18.4		18.3		16.3		
19						18.3		21.6		16.9		
20						18.2		18.0		16.2		
21						18.6		17.6		16.2		
22						18.9		17.8		17.0		
23						18.9		18.0		17.5		
24		15.1				19.2		18.9		17.1		
25		16.0				19.4		19.1		18.0		
26		15.0				18.7		18.2				
27		15.6				18.5		17.5				
28		15.7				18.2		17.6				
29		16.1				17.7		17.3				
30		16.0		15.9		18.3		17.6				
31				17.1		18.3						
June Sec. Ft.												
Total Ac. Ft.												

TOTAL FOR ACRE FEET